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## COMMUNICATIONS

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### GENERAL SCIENCE OR SPECIAL SCIENCE

#### *Substituting the Encyclopedic for the Educative?*<sup>1</sup>

##### *To the Editor:*

The issues raised in the last number of the *School Review* by the two articles on general science and the editorial comment thereon are of such importance in the pending organization of the science curriculum of the high school as to demand the attention of all who are interested in secondary science instruction. There has long been a conviction on the part of many students of secondary education that the existing organization of the special sciences is such as to defeat the best uses of science in high-school education. The difficulty is greatest in the earlier years when too often facts are learned by rote and there is entire failure to appreciate scientific methods. Furthermore, recognition of principles is impossible without some personal acquaintance with the methods by which principles are developed.

In many parts of the United States high-school science teachers with training in science, and with a genuine desire to use science for the best education of high-school pupils, have been trying to use their scientific method, not only in dealing with the objects of nature about which they give instruction, but also in studying their pupils and in experimentation with different types of organization of science for first-year work. The fact that these experiments have been of different nature is not evidence of chaos, but evidence that real experimentation is going on and that the different possible ways of securing the desired results are being tried. What scientist can object to such a procedure? Indeed, it may finally be shown that several types of organization are good, one in one school, another elsewhere. There are few really worthwhile centers of learning which have but one road leading to them. Indeed, an objective point toward which but a single road may lead is likely to be an obscure terminus suitable for secluded vacation from productive human activities, but not suitable for our social and intellectual relations with men. A brief look at an experiment in teaching first-year science may seem to present a chaotic view to one who does

<sup>1</sup> See the *School Review*, January, 1915, p. 43.

not understand the purpose and plan of procedure of the high-school teacher, just as a view of the highly differentiated set of courses of a university department may seem chaotic to one uninformed in the subject, or as the internal workings of a great manufacturing plant may seem chaotic to those who do not study the plan of work long enough to see the materials, processes, and products that are involved.

The unity of general science must be secured through continuity of method and coherence of the topics which compose the outline of the course. From the pupils' point of view this is a true and appreciated unity, a truer unity, so far as the pupil is concerned, than sometimes is presented in the plan of unity of a specialized science.

The accusation that general science is encyclopedic is true in the sense that it attempts to include a measure of scientific information which seems to be appealing and worth while to young learners. It is certainly hoped that general science, and all science, will leave pupils in possession of valuable information—certainly no virtue attaches to the absence of such information. It is equally clear in the minds of teachers of general science that the really educative processes which science should carry out are best developed when the learner has the sort of dynamic attitude that accompanies a feeling that the work in hand is worth while for him. Information in science does not find its chief foundation in the fact that it brings a valuable tangible return to the pupil in the form of a better livelihood, but in the fact that by furnishing him a dynamic purpose for working he works more intelligently and more efficiently, and consequently is better educated thereby. Science should give information which enables people to live better, but it should give training which makes a still larger contribution to proper living. Then, if the accusation of being encyclopedic is to be urged, it may be safely asserted that general science is certainly less encyclopedic to first-year high-school pupils than is the formal science which they have so generally been asked to learn.

The limits of this brief editorial response are such that certain specific data bearing upon general science cannot be presented here, but this will appear in a later issue of the *School Review*.

OTIS W. CALDWELL

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